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ABSTRACT

The first of two papers describes the techniques used at a school of nursing to develop 98 independent learning modules for an on-going, statewide, continuing education project designed to meet the needs of professional nurses practicing in the field. The paper focuses primarily on the administrative problems related to the project: e.g., test administration for the awarding of continuing education units (CEUs); recruitment of, and negotiations with, subject matter experts to write the content of the modules; and logistical problems encountered in the circulation of the modules and equipment needed to implement them. The second paper describes a study which focused on the effectiveness of a module on metrics for nursing that was developed in this project. The subjects for this study were 36 students in an undergraduate class who were randomly divided into two groups. Group I was shown videotapes on the metric system, while the same material was presented to Group II in a written format which included hands-on activities and immediate feedback. The results of the study supported the theory that hands-on activities and immediate feedback are valuable in instruction; however, the study did not provide evidence that one medium was superior to the other. Twelve references are listed. (Author/LLS)

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Comparison of Print and Nonprint Media In a Nursing Learning Module

by

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Comparison of Print and Nonprint Media In a Nursing Learning Module

In the spring of 1977, the University of Southern Mississippi School of Nursing produced an independent learning module Metrics for Nursing. The Continuing Education Program and the Instructional Resource Program cooperated in the production of the module which was intended for use by registered nurses served by the Continuing Education Program in the state of Mississippi.

The module consists of a pretest, objectives, instructions, learning activities, progress checks, posttest, and a module evaluation. The learning activities include videotapes for the initial presentation of the content material and a printed manual which includes computation drill exercises. The manual consists of the instructions for the module, objectives, study questions after each section which serve as the module's progress checks, competency tests which serve as the module's posttest, and a module evaluation form.

The module is divided into five sections. The first section is an introduction to the Metric System (SI). The remaining four sections present the concepts of length, area, volume, and mass. One ten to twenty minute videotape presents each section and corresponding written material provided in the manual uses the same graphics and illustrations presented in the videotapes in addition to a computation drill. The drill adds a hands-on element to the manual in addition to the passive presentation of the videotapes. The printed manual has a unique format which places the answers to the study questions in a different

part of the manual from the questions themselves. The study questions and answers serve as progress checks for the module and provide the learner with immediate feedback. The audiovisual and printed learning activities were developed to be used in conjunction with and to complement one another. They were also designed to be used independently if desired or necessary. The purpose of the study was to determine if the two formats could function equally as separate, independent learning activities.

The literature reveals that similar studies have been done (Craytor and Lysaught, 1964[1]; Dearden and Anderson, 1969[2]; Feldman, 1969[3]; Quiring, 1972[4]; Sanborn et al, 1973[5]; Stein et al, 1972[6]; Thompson, 1972[7]). Research found in medical and paramedical or educational literature report studies involving audiovisual instruction in nursing. Eisele (1973)[8] proposed that a systems approach may be useful for improving instructional decision making. Aiken (1970)[9], using a systems approach to curriculum development, cited a "shift toward the view that the most important function of a medical school is to transfer the burden of education to the student himself" (p. 107). The systems model for development of instructional materials used by the Medical Center at the University of Illinois (Penta, 1973)[10] is helpful in planning instructional materials. In the model, basic science and clinical curriculums were revised from traditional instructional strategies based on lectures as the primary teaching method to a student-centered curriculum of the Illinois Medical Center. Griggs (1977)[11] did a further study involving four (4) control groups

comparing audiovisual instruction (AV), programmed instruction (PI), AV-PI, and a no exposure group in a minicourse for nurses and other hospital personnel on respiratory therapy in the Department of Biology, Georgia State University, Atlanta. Pre- and posttests were used to collect the data and analysis of variance to treat it. AV and PI groups scored higher than the no exposure group, but the AV-PI group scored the highest.

Crosby (1977)[12] designed at the University of Virginia School of Nursing a microteaching project to increase the teaching effectiveness of nurses in Virginia. The students were divided into two groups with each group receiving a different instructional technique. The lecture technique was used with one group, and a group discussion technique was used with the other group. Pre-, mid-, and posttest scores were used to measure achievement. Analysis of variance was used to treat the data. Both groups had a significant increase in achievement. It should be noted, however, that both groups' achievement was significant at the $p.<01$ level. There was no measurable difference in the performance of the different instructional techniques.

In the University of Southern Mississippi School of Nursing study, an undergraduate class was divided into two groups. Group I experienced non-print media; Group II experienced print media; both groups were administered the same evaluation instruments. The instruments consisted of paper and pencil competency tests developed and validated especially for use in the Metrics for Nursing module. The data was treated by use of an analysis of variance to determine if there was a measurable

difference between the achievement of the two groups.

The hypothesis of this study was the null hypothesis--that there would be no significant difference between the performance of the two groups.

Methodology

The ideal population on which to test an independent learning module designed for Continuing Education (CE) is CE students. Due to logistic and time restraints, this was not possible. However, after considering the nature of the study, it was the opinion of the investigator that the undergraduate class used provided reliable data for the purpose of the study.

The investigator has observed that the metric system of measurement is as new to undergraduate students as it is to older CE students. Both populations are faced with the same problem. Both populations have had a long time span in which to learn and develop skills in the use of the English and apothecary systems. These systems are mastered prior to being applied to the occupational setting.

English and apothecary	Learning Time (quantitative information)	: Application to Skill

Metric System	Learning: Time :	Application to Skill

Figure 1

Learning Time Span Illustration

With the introduction of SI, the time span for learning is reduced to a fraction of the time span available for learning the traditional systems (see Figure 1).

The media formats used in the Metrics for Nursing module, although independent, closely paralleled each other in content and content sequence in order that the learner would get the full impact of the information without the distraction of having to sort out and categorize different forms of the same information. These media formats were designed to support a "crash" program of learning so that the saturation point would be reached in a minimum of time.

Both populations, undergraduate and CE students, face the same problem in learning the new system, therefore the data gathered in this study should be reliable in making inferences about the CE population.

The population of this study consists of thirty-six (36) undergraduate students enrolled in Nursing 301 in the Summer Quarter of 1977, in the University of Southern Mississippi School of Nursing. Nursing 301, Nursing Process in the Health Continuum, a three (3) semester hour course, is the first clinical nursing course of the second level. This course is designed to enable students to apply knowledge and skills acquired from previous courses and to utilize that knowledge in nursing selected patients.

The population is assumed to be homogeneic in that it consists of undergraduate students enrolled in the same course with the same prerequisites at the same time and in the same institution.

Two paper and pencil competency tests were used in this study. The instruments were developed by the authors of the Metrics for Nursing module for use as posttests in the module. The instruments were validated by use of faculty colleague review, and by use in a previous course. Revisions were made based upon the colleague review and on an item analysis resulting from their first use.

The first assignment in Nursing 301 was a drug module that had to be mastered by a given date early in the quarter. If the drug module had not been mastered by the assigned date, the students were not allowed to continue the course. At the time of the study, Summer Quarter, 1977, the faculty team teaching the course was redesigning the drug module. Nursing 301 faculty selected Sections A and D of the metric module for inclusion in the drug module Summer Quarter in order to test the module's effectiveness. Sections A and D were selected for their appropriateness in Nursing 301. Metrics for Nursing Section A serves as the introduction to the module and gives a general overview of SI. Section D deals with the measurement of volume and applies it to nursing. Sections A and D were the first assignments given the students who were randomly divided into two laboratory sections at their first class meeting. A few exceptions were made to accomodate individual students' schedules thus resulting in the sections not being equal in number. Twenty-one (21) students were placed in Section I and fifteen (15) students in Section II. These laboratory sections were used as the groups in this study. Group I, at its first laboratory session, was shown the videotapes covering Sections A and D

of the metric module; at their first laboratory session, Group II was assigned Sections A and D in the text portion of the metric module and required to complete all the excercises in the manual. Group I was allowed to view the videotapes as often as they desired in the School's Learning Center (LC). Group II was allowed to use the written text as often as desired in the LC. Group I was not allowed to use the printed material. Group II was not allowed to use the videotapes. At a regular class meeting ten (10) days after the assignments were made the competency tests for Sections A and D were administered.

An analysis of variance comparing the results of Group I and Group II on Section A and Group I and Group II on Section D (see Figure 2) shows that no significant difference existed between Groups I and II on Section A and therefore, the null hypothesis was accepted for Section A. A significant difference at $p. < 05$ did exist between Group I and Group II on Section D and therefore, the null hypothesis was rejected for Section D. Group II, which experienced the print media format, performed significantly better than Group I, which experienced the non-print media format.

Analysis of Data

Group I	21 subjects			
Group II	15 subjects			
Variable	1 analysis			
Source	Mean Square	D.F.	F-Ratio	P
Total	20.9040	35.		
Groups	2.4023	1.	.112	.7390
Error (G)	21.4482	34.		
G Mean	1	2		
	13.5238	13.000		
Variable	2 analysis			
Source	Mean Square	D.F.	F-Ratio	P
Total	6.9429	35.		
Groups	27.4570	1.	4.331	.0426
Error (G)	6.3395	34.		
G Mean	1	2		
	4.7619	6.5333		

Figure 2

Analysis of Variance

Discussion and Conclusion

On Section D the group that experienced the printed text performed significantly better than the group that experienced the videotape. It is the opinion of the investigator that this finding cannot be attributed to a difference in the quality of the two media. The videotape was not inferior in quality to the printed text. This is supported by the fact that a videotape from this module won a national award in the

spring of 1977. The difference was not because print, as a format, is superior to nonprint. The difference can be attributed to the different techniques employed in the two formats, although the text and tapes were parallel in content and content sequence. The text included one additional component not provided by the tapes--computation drills with study questions at the end of each drill complete with the correct answers provided in a different part of the text. Therefore, immediate feedback was provided to the learner. These study questions and answers serve as the progress checks for the module. The difference, therefore, results not from the difference in the formats or their quality, but from their participatory techniques. The videotapes provided passive learning activities. The text provides an active learning activity. Videotapes do not have to be passive; they can elicit active learning experiences requiring learner participation.

It is the conclusion of the investigator that inferences cannot be made from this study concerning the effectiveness of print versus non-print formats. However, inferences can be drawn concerning the importance of active learning experiences as opposed to passive learning experiences, especially in the case of learning involving mathematical skills and where application of the learning is being made. This study also provides evidence to support the importance of progress checks and immediate feedback as components of learning modules as well as learning activities in general.

There was no significant difference in the performance of the print and non-print media in Section A because both formats for this

section provided passive learning activities. Although Section A in the written text did include study questions, there were no computation drills involved nor were applications to nursing made.

It was determined that the print learning activity could function successfully independent of the non-print learning activity. The non-print learning activity does not function independently in the advanced portions of the module that require computation drill and application of the learning.

This study lends some support to the theory that active learning experiences augmented with progress checks and immediate feedback are more effective than passive learning experiences without these advantages.

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Development of Independent Learning Modules for Use in Nursing Continuing Education: Lessons Learned from the First Project of This Type

by

Milner H. Myers, Jr.

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Development of Independent Learning Modules for Use in Nursing Continuing Education: Lessons Learned from the First Project of This Type

Nursing education pioneered the use of learning modules in post-secondary education. The independent learning module designed for the RN Continuing Education student is a significantly different type of module when used in an individualized Continuing Education project. It is different because it must be independent. Independent means the module is completely self-contained and able to stand alone. It is not used in a classroom setting. It is not used in a conference, workshop, or seminar method. There are no faculty present to assist. The independent module must be completely self-contained with all materials needed for learning experiences including media hardware. Explicit step-by-step instructions for the use of all materials, hardware, and learning activities must be included. The learner uses the module at home or in any other location that is convenient.

Independent modules were developed by the University of Southern Mississippi School of Nursing for use in an on-going statewide Continuing Education project designed to meet the needs of professional nurses associated with small, isolated, rural health facilities whose staff are so limited that they cannot allow them to travel to distant points to attend classes, workshops, or conferences. One hundred independent learning modules have been developed and disseminated to professional nurses throughout the 82 counties of Mississippi. Upon successful completion of the module,

Continuing Education Units are awarded.

This paper presents the lessons learned in this project with emphasis on the development of independent modules which will stand alone and administrative considerations when developing this type of independent study unit.

Independent Modules

In the learning modules developed for use in traditional generic programs, the learning experiences which often consist of educational media in various formats such as film strips and video cassettes are often built around passive learning experiences. These experiences are passive in that the media presents information, but seldom has a hands-on component. Additional or supplemental readings may be provided or required which further develop the presentation. Hands-on, active learning experiences are seldom included in the module but are provided in the classroom or the Skills Laboratory after the module has been experienced or in conjunction with the module. In generic programs students may be instructed to go to the Learning Center and experience a module which is passive in nature and then at the next class meeting the module will be discussed. Interaction occurs between faculty and students concerning the information presented in the module. These sessions include faculty demonstrations and hands-on practical exercises by the students.

It became apparent when developing independent learning modules that these extra follow-up class sessions, demonstrations, and hands-on practical exercises were essential and must be incorporated into the independent module. This is done by creating active learning experiences that require action by the student and provide hands-on practical learning activities. This can be done. From the lessons

learned in the project it is believed that one of the best means for accomplishing this is to develop a module booklet that contains detailed instructions including instructions for any media or supplemental reading materials that may be included as well as progress checks with immediate feedback and practical hands-on exercises. Throughout the booklet the instructions must be simple and explicit. The progress check questions must be clear with precise answers available within the booklet. These questions and answers must be explicit so that they provide the learner with a check on his progress rather than confuse him. The directions for practical exercises must be clear and detailed. Any materials needed must be either provided or be available to the student at his/her location

These booklets must be carefully field-tested prior to their use to make certain that they will function adequately. The author has conducted research comparing passive learning experiences to active learning experiences in an independent module and the evidence indicates that active learning experiences perform significantly better than passive experiences.

Administrative Concerns

1. Contracts. When subject matter experts, whether they be your faculty or outside consultants, are contracted to develop independent modules, you should be certain that the following points are stated in the contract and are clearly understood.

   (1) The content must be at the level of the professional practitioner in the field. Modules developed for use in generic programs cannot be simply relabeled Continuing Education since they cover material the RNs should have already mastered.

(2) The language of the module should not insult the adult RN. They should be addressed and referred to as adults and as nurses.

(3) A date for completion must be inserted with a penalty for failure of compliance.

(4) Any questions concerning copyright should be answered in the contract. Will the institution copyright the material? Will the author copyright the material? Will they hold the copyright jointly? Will the author's previously copyrighted material be included as part of the module?

(5) In the event that the modules are sold there should be an agreement in the contract concerning the disbursement of any profits or royalties resulting from these sales and whether or not the author will share in them. In most cases the sponsoring institution will be fortunate to recover some of its cost in the sale of these materials and will seldom, if ever, have any profit to share.

2. When developing modules and procuring or designing media programs for inclusion as part of the module learning experiences, careful attention should be paid to the media format to insure that the clients in the field for whom it is intended have the appropriate hardware to use the format or that such hardware can be provided by the Continuing Education project.

3. When establishing a project of this type provison should be made for evaluation of the modules and immediate revision in the event of content error. Provision should be made for periodical review and update revisions as the modules become obsolete.

4. Needs assessments of the target audience should provide information concerning not only the subject matter needs of the clientele but also the types of media equipment available and the numbers needing a particular program.

Independent learning modules must be tailor-made to fit the needs of the particular project in which they are used. Through creative design and ingenuity of format they can include active learning experiences which successfully function in the field. Examples of independent module booklets and materials are on display. The author is available for discussion, questions, and consultation.

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